

ON SOME GENERA OF STOLONIFEROUS
OCTOCORALS (COELENTERATA: ANTHOZOA),
WITH DESCRIPTIONS OF NEW TAXA¹

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Abstract.—Several stolonate octocorals, misinterpreted by previous authors owing to incomplete or misleading descriptions and inadequate illustrations, are reevaluated on the basis of new material. Revised taxonomic assignments are proposed for *Cyathopodium ingolfi* Madsen (new genus *Scyphopodium*), *Cyathopodium elegans* Deichmann (new genus *Stereotelesto*), *Telesto rigida* Wright & Studer (new genus *Bathytelesto*), *Sarcodictyon gardineri* Gohar (new genus *Rhodelinda*), *Sarcodictyon pacificum* Hickson (= *Cyathopodium tenue* [Dana]), *Sarcodictyon rugosum* Pourtalès (= *Scleranthelia rugosa*), and *Rolandia rosea* (Philippi) (= *Sarcodictyon roseum*). The distribution of *Scyphopodium ingolfi* is extended to the mid-Atlantic Ridge and South African waters and, as a Pleistocene fossil, to the Mediterranean Sea. A new stolonate octocoral from the Caribbean is described as *Tesseranthelia rhodora*.

Introduction

During dives aboard the submersible research vessel *Cynara*, in the Hellenic Trench south of Crete, Dr. Helmut Zibrowius collected fossil sponges covered with a stoloniferous octocoral that appeared to be nearly or quite contemporaneous. These specimens were similar to, if not identical with, a small Recent specimen from the mid-Atlantic Ridge found by Dr. Zibrowius while studying corals collected by the research vessel *Jean Charcot*. These are morphologically indistinguishable and agree in all significant details with specimens taken south of Iceland by the *Ingolf* Expedition and described by Madsen (1944:12) under the name *Cyathopodium ingolfi*. Assignment of those octocorals to the genus *Cyathopodium* Verrill, originally established for the tropical Pacific *Aulopora tenuis* Dana, was considered doubtful by Madsen, and was based heavily upon the allocation by Deichmann (1936:38) of a red stoloniferous coral from the West Indies to that genus. Unfortunately, Deichmann overlooked the fact that her coral is *Telesto corallina* described by Duchassaing in 1870. Although undoubtedly a member of the family Telestidae, *T. corallina* (along with *T. rubra* Hickson and *T. rigida* Wright & Studer) differs from other species of *Telesto* in having the sclerites of the polyp walls inseparably fused, a character it

¹ Scientific contribution from the Rosenstiel School of Marine and Atmospheric Science, University of Miami.

shares with *Cyathopodium ingolfi* Madsen. *Cyathopodium tenue* has small, conical anthosteles arising from a delicate stolonial network and is not a telestid. In *C. ingolfi* the anthocodial sclerites are arranged quite differently from the condition in *C. elegans* and, apart from its inseparably fused red sclerites, this species has little in common with *C. tenue* (which is, moreover, an Indo-Pacific reef-dweller whereas *C. ingolfi* was taken from 1301 m in the North Atlantic and *C. elegans* from 70–180 m in the Antilles). The morphological, geographical, and bathymetrical evidence indicates that three genera are involved here: 1) the original and true *Cyathopodium*; 2) the false *Cyathopodium* of Deichmann, which is a telestid; and 3) the false *Cyathopodium* of Madsen, which he doubted in the first place and which fits no genus heretofore described.

This situation is further complicated by the fact that some shallow-water Pacific colonies of true *Cyathopodium* have been referred to *Sarcodictyon* Forbes (Hickson, 1930), a northeastern Atlantic genus, through misinterpretation of Herdman's ambiguous description of spicules firmly wedged together in *Sarcodictyon*, which really does not at all say that they are fused. The result is that some true *Cyathopodium* species are known under the generic name *Sarcodictyon*, and some *Clavularia*-like stoloniferans from the sub-Antarctic have been assigned to *Sarcodictyon* (Gohar, 1940) when, in fact, they have more in common with *Telesto rigida* Wright & Studer.

Examination of the type-specimens of *T. rigida* in the British Museum (Nat. Hist.) shows that tall secondary polyps are not produced in that species as reported by Wright & Studer (1889:261) and accepted by Laackmann (1909:73), Kükenthal (1913:233), and Deichmann (1936:40, 41). Thus *T. rigida* more closely resemble "*Sarcodictyon*" *gardineri* var. *rosea* Gohar from the sub-Antarctic.

The small, white stoloniferan from off Havana described as *Sarcodictyon rugosum* by Pourtalès (1867:113) and doubted by Hickson (1930:211) and Deichmann (1936:37) does, in fact, superficially resemble *Cyathopodium* but has platelike sclerites and is congeneric, if not even conspecific, with *Scleranthelia musiva* described by Studer (1878b) from off Cape Verde. Pourtalès' coral has now been found in some numbers from scattered locations in the Straits of Florida and West Indies, along with a single find of a red form that is distinctively different.

In the light of so much new material for interpretation of the old, this nomenclatural jumble is here amended.

Taxonomic Discussion

Cyathopodium Verrill

Cyathopodium Verrill, 1868:415 (type-species, *Aulopora tenuis* Dana, 1846:631, pl. 59, fig. 5; by monotypy.

non *Cyathopodium*.—Deichmann, 1936:38.—Madsen, 1944:11.

Sarcodictyon.—Hickson, 1930:209 (part).

Diagnosis.—Low, conical calices arise at wide intervals from narrow, ribbon-like, reticulating stolons; walls of stolons and calices rigid, consisting of inseparably fused sclerites, penetrated by minute pores; anthocodial sclerites small, none specially differentiated as opercular scales.

Distribution.—Tropical central and western Pacific, on reefs.

Remarks.—Of the Indo-Pacific species attributed to *Sarcodictyon* by Hickson (1930:211), it is probable that only one, *S. pacificum* Hickson, is actually a *Cyathopodium*.

Cyathopodium tenue (Verrill)

Fig. 1b

Aulopora tenuis Dana, 1846:630, pl. 59, fig. 5 (Raraka Island, Paumotu Archipelago).

Cyathopodium tenue.—Verrill, 1868:415.—Deichmann, 1936:38.

Cyathopodium tenuis.—Madsen, 1944:11, 14.

Sarcodictyon pacificum Hickson, 1930:212, pl. 2, figs. 1–6 (Marquesas; Tahiti).—Gohar, 1940:12, pl. 1, fig. 1.

Description.—See Hickson, 1930:212.

Material examined.—Three lots from Palau Islands, USNM 56586, 59105, 59114.

Remarks.—The walls of stolons and calices are of almost glassy translucence. All traces of their component sclerites are obliterated save immediately around the calicular margins, where sclerites in various stages of fusion can be observed. Color of the skeleton in a single colony may vary from carmine red to pale pink.

Records indicate that this species commonly inhabits the dead parts of other corals, such as *Millepora* (Dana), *Lobophyllia* (Hickson), *Turbinaria* and *Montipora* (present material), as well as reef rock (present material).

Scyphopodium, new genus

non *Cyathopodium* Verrill, 1868:415.

Cyathopodium.—Madsen, 1944:11.

Diagnosis.—Short, cylindrical anthosteles with rigid walls formed by a close calcareous meshwork of fused, branching sclerites arising from ribbon-like stolons also having rigid walls, encrusting solid objects; lower part of gastric cavity filled by intrusion of fused calcareous spicules, penetrated by 8 longitudinal canals; anthocodiae with irregularly tuberculate rods and crosses not fused and not arranged in converging points; white.

Type-species.—*Cyathopodium ingolfi* Madsen, 1944:12, here designated.

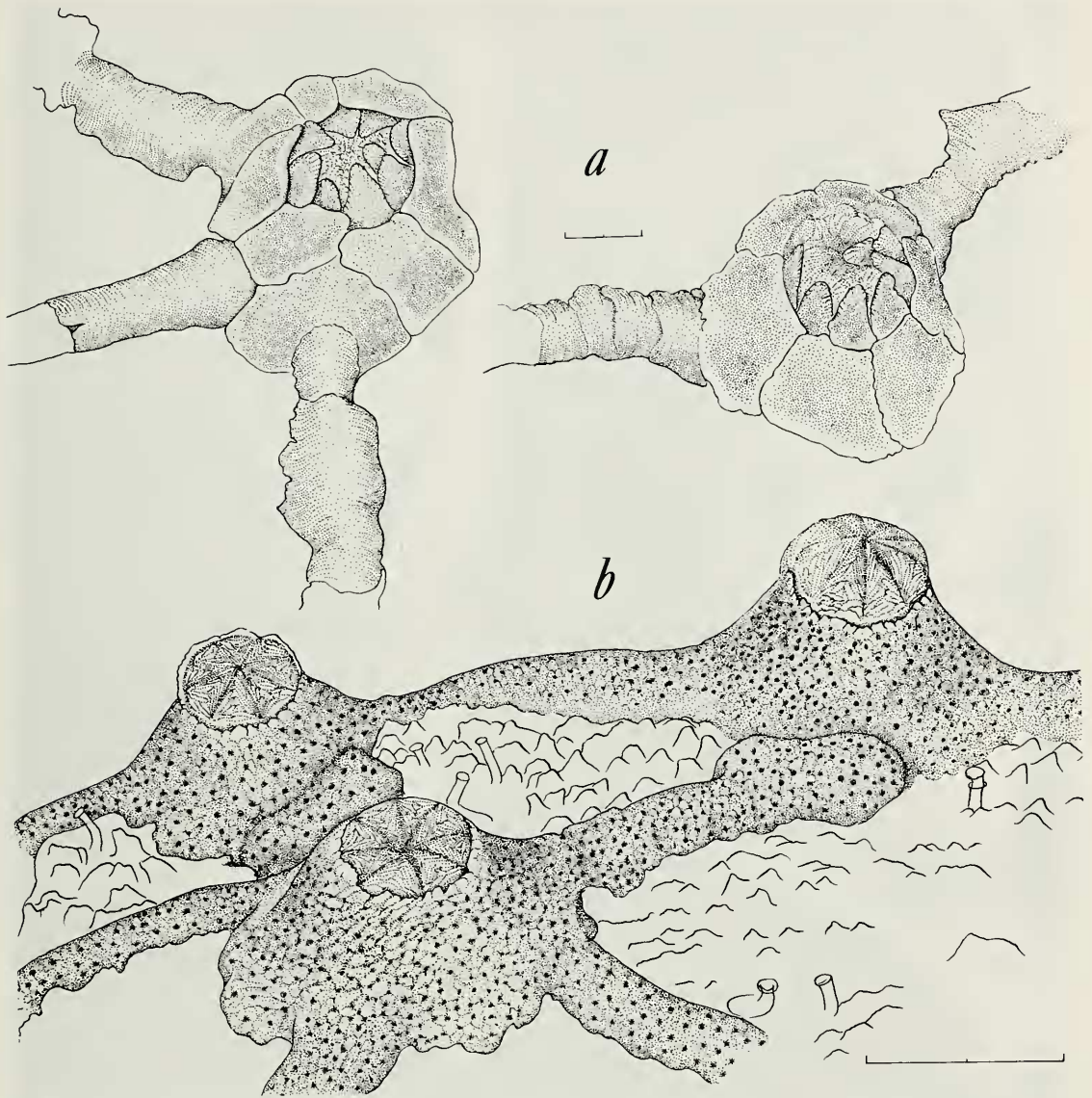


Fig. 1. a, *Tesseranthelia rhodora*; b, *Cyathopodium tenue*. Both scales = 1 mm.

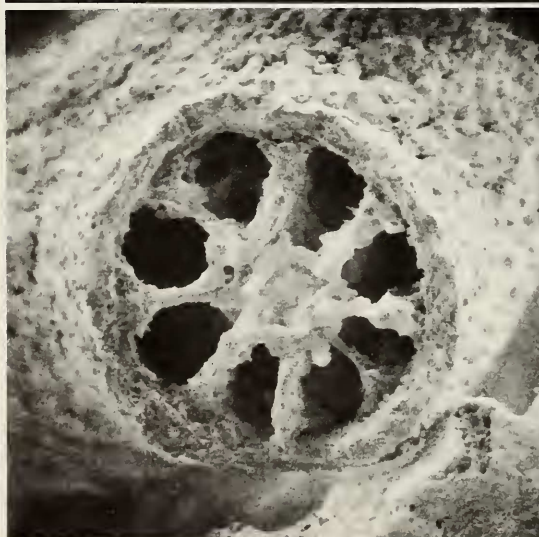
Etymology.—From Greek σκύφος, cup + πόδιον, a little foot. Gender, neuter.

Remarks.—As Verrill's genus *Cyathopodium* was established for Dana's *Aulopora tenuis*, and Deichmann's *Cyathopodium elegans* is a Caribbean telestid, Madsen's doubt that his *C. ingolfi* belonged in the same genus was fully justified.

Scyphopodium ingolfi (Madsen)

Fig. 2

Cyathopodium ingolfi Madsen, 1944:12, figs. 9–14 (South of Iceland, 63°08'N, 15°40'W, 1301 m, bottom temperature 3.9°C; Ingolf Sta. 54, 18 May 1896).



Description.—See Madsen, 1944:12.

Material examined.—Azores, northeast of Corvo: 34°46.3'N, 29°37.9'W, 1949 m, *Jean Charcot* cruise MAPCO 1, dredge 2, 10 October 1979: small colony attached to *Solenosmilia variabilis* Duncan, USNM 59806.

Mediterranean Sea off Crete, 30 miles southeast of Gavdhos, in Hellenic Trench: 34°24'N, 24°26.9'E, *Cyana* dive 14, 2216 m, 11 September 1979, coll. H. Zibrowius; complex network of stolons with many calices, attached to (and probably contemporaneous with) fossil sponge: USNM 59805.

Off South Africa, in Agulhas Current: 35°10.5'S, 23°02'E, 500 m, Deutsche Tiefsee Exped. *Valdivia* sta. 103, 2 November 1898; several isolated calices and stolon fragments, some with soft tissue; Berlin Museum.

Off South Africa, Natal: 27°59.5'S, 32°40.8'E, 550 m, *Meiring Naude* SM 86, 22 May 1976: one calicular base on stolon attached to scleractinian coral *Trochocyathus rawsonii* sensu Gardiner, 1904, non Pourtalès, 1874; South African Museum Cape Town, H2813.

Remarks.—The remaining characters of the fossilized material (Fig. 2) collected in the Hellenic Trench by Dr. H. Zibrowius agree in all respects with the detailed descriptions of *Cyathopodium ingolfi* given by Madsen (1944:12), and there is little doubt that they represent the same species. The stolons are more solidly calcified (Fig. 2) than in the *Ingolf* material, as might be expected in a richly developed adult colony. The specimens occur in a Pleistocene thanatocoenosis consisting mainly of large sponges and scleractinians. The age of *Desmophyllum cristagalli* Milne Edwards & Haime from the same sponge has been determined by C¹⁴ analysis to be 18,200 ± 500 years (H. Zibrowius, pers. comm. 27 January 1981).

It is possible that the octocorals were attached to the living sponges, or that they settled on the sponges after they were killed by some volcanic event in that geologically unstable area. The octocorals, like the sponges, are covered by manganese oxides.

The specimen from the Azores (USNM 59806), although very small, conforms very well with the original account of *C. ingolfi*, as does a broken calyx on a stolon attached to a scleractinian from off Natal (Fig. 2). The material collected by the *Valdivia* consists of polyps up to 1 cm tall, thus larger than the largest reported by Madsen. Most contain the soft tissue but the tentacles are completely retracted so their sclerites cannot be observed. One broken calyx with part of its stolon has been examined by SEM and shows an early stage in the development of the meshwork of fused sclerites

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Fig. 2. *Scyphopodium ingolfi*: Top, part of fossil colony from Hellenic Trench, ×10; Middle, broken stolon of same, ×34; Bottom, base of calyx of specimen from Natal, ×40. SEM stereo pairs.

in the stolon and proximal part of the calyx. Altogether, this remarkable material from widely separated localities leaves little doubt that *Scyphopodium ingolfi* (Madsen) is a widely distributed octocoral in depths from 500–1000+ m.

Stereotelesto, new genus

Telesto.—Hickson, 1900:480 (part).—Laackmann, 1909:41 et seq. (part).—Kükenthal, 1913:229 (part).

Cyathopodium.—Deichmann, 1936:38 (part).

Diagnosis.—Telestids with tall axial polyps, short lateral polyps not strictly in one plane; gastric cavities not filled in proximally with mesogloea containing sclerites; outer surface of body walls smooth, formed by inseparably fused tuberculate rods; anthocodiae with blunt, spinous rods longitudinally or *en chevron* below tentacles, forming 8 points, pinnules with flat rodlets. Color, red, anthocodial sclerites yellow to colorless.

Type-species.—*Telesto corallina* Duchassaing, 1870.

Etymology.—Greek στερεός, hard + *Telesto*, gender feminine.

Distribution.—West Indies; Indian Ocean (Maldive Islands).

Stereotelesto corallina (Duchassaing)

Telesto corallina Duchassaing, 1870:19 (Guadeloupe, 300 feet).—Bayer, 1961[1962]:34, figs. 1, 9b (Puerto Rico, 39–100 fath.).

Cyathopodium elegans Deichmann, 1936:38, pl. 2, figs. 1–4 (Barbados, 69 and 81 fath.).

Description.—See Bayer, 1961[1962]:34.

Records.—All of the specimens available to me, 9 lots, were dredged off Puerto Rico in 73–183 m by the Johnson-Smithsonian Deep Sea Expedition, except two from Barbados, one from 146 m collected by the University of Iowa Barbados-Antigua Expedition, the other from 50–400 m collected by John Lewis. The distribution of this species appears to be limited to the Antillean Arc.

Bathytelesto, new genus

Telesto (*Telesto*).—Wright & Studer, 1889:260 (part).

Telesto.—Laackmann, 1909:41 et seq. (part).—Kükenthal, 1913:229 (part).—Deichmann, 1936:40 (part).

Type-species.—*Telesto rigida* Wright & Studer, 1889, here designated.

Etymology.—From Greek βάθυσ, deep + *Telesto*, gender feminine.

Diagnosis.—Telestids with tall axial polyps rarely producing short lateral polyps; gastric cavities not filled in proximally with mesogloea containing

sclerites; body walls externally smooth, rigid but thin and brittle, filled with inseparably fused irregularly spinose rods; anthocodiae with prickly spindles placed longitudinally below tentacles in 8 strong septal and 8 weaker inter-septal tracts, but sclerites absent from tentacles and pinnules. Color, light red.

Bathytelesto rigida (Wright & Studer)

Telesto rigida Wright & Studer, 1889:261, pl. 37, fig. 3; pl. 42, fig. 9 (west of Azores, 38°18'00"N, 34°48'00"W, 1675 fath., *Challenger* sta. 71, 27 June 1873).—Laackmann, 1909:73.—Kükenthal, 1913:229–236, passim.
non *Telesto rigida*.—Nutting, 1909:685 [= *Telesto californica* Kükenthal, 1913].

Description.—See Wright & Studer, 1889; Laackmann, 1909.

Remarks.—Examination of the type-specimens in the British Museum (Nat. Hist.), register no. 1890.4.11.33, shows that the tall lateral polyps produced by the primary polyps as described by Wright & Studer actually are primary polyps attached to other polyps; lateral polyps are scarce and the only ones observed were very short.

Sarcodictyon Forbes

Evagora Philippi, 1842:36 (type-species, *Evagora rosea* Philippi, 1842, by monotypy).—Kükenthal, 1916:458.—Molander, 1929:40.
non *Evagora* Péron & Lesueur, 1810 (Hydrozoa); nec Laporte & Gory, 1839 (Coleoptera).

Sarcodictyon Forbes in Johnston, 1847:179 (type-species, *Sarcodictyon catenata* Forbes in Johnston, 1847, by monotypy).

Rolandia Lacaze Duthiers, 1900:424 (type-species, *Rolandia coralloides* Lacaze Duthiers, 1900 = *Evagora rosea* Philippi, 1842, by monotypy).—Weinberg, 1978:166.

Sarcodictyon.—Thorpe, 1928:482 [doubtful].—Hickson, 1930:210 [part].

Diagnosis.—Simple, fully retractile polyps arise from narrow, ribbonlike, reticulating stolons sometimes fusing to form wider membranous expansions; sclerites in the form of small 6-radiates, commonly more or less flattened, sculptured by low to moderately prominent granulations and blunt prickles chiefly concentrated near the ends of the rays; many crosslike twinned sclerites present. Anthocodiae with few, small sclerites or none at all.

Type-species.—*Sarcodictyon catenatum* Forbes, by monotypy.

Distribution.—Northeastern Atlantic and Mediterranean waters.

Remarks.—There is no fusion of sclerites. The erroneous diagnosis given by Deichmann (1936) and Bayer (1956) repeated Hickson's misconception of the genus.

Discussion.—The relationship and affinities of this genus have been a matter of debate for years (Molander, 1915:42; 1929:40; Kükenthal, 1916:458; Hickson, 1894:331; 1930:209). Weinberg (1978:166) convincingly demonstrated that *Rolandia coralloides* Lacaze Duthiers, 1900, is not an encrusting growth form of *Corallium*, as had been suggested by Molander (1929:41), but is identical with *Evagora rosea* Philippi, 1842. As the generic name *Evagora* is twice preoccupied, he employed the junior synonym *Rolandia* Lacaze Duthiers, 1900. Weinberg ruled out of consideration the genus *Sarcodictyon*, having been misled by the supposition that the sclerites of *Sarcodictyon* are inseparably fused. This misconception resulted from Hickson's (1921:367; 1930:210) misinterpretation of Herdman's (1883:41) statement that "the different forms are produced by the union of a few simple spicules shaped like a wedge." This error unfortunately was perpetuated by Deichmann (1936:32), Gohar (1940:12) and me (Bayer, 1956:F184). The description and figures given by Herdman (1883), as well as an examination of actual specimens, demonstrate beyond a doubt that the sclerites are quite separable and that they consist principally of 6-radiates, with a large proportion of cross-shaped twinned forms that show distinct suture lines between "wedge-shaped" components. They differ in no generically significant way from the sclerites of *Rolandia rosea* illustrated in the drawings and SEM micrographs presented by Weinberg (1978:pls. 17, 18). Although *Rolandia rosea* and *Sarcodictyon catenatum* may prove to be conspecific, pending direct comparison it is preferable to maintain them as two species of a single genus the name of which is *Sarcodictyon* Forbes.

Sarcodictyon catenatum (Forbes)

Fig. 3

Sarcodictyon catenata Forbes in Johnston, 1847:179 (Youghal; Loch Fine; west coast of Scotland).—Gosse, 1858:276, pl. 9.—Herdman, 1883:31, pls. 1–3; 1895:163, pl. 8.

Sarcodictyon catenatum.—Thomson, 1927:8, pl. 2, fig. 17 [that part of the material from the Mediterranean may be *S. roseum* rather than *S. catenatum*].

Evagora catenata.—Kükenthal, 1916:461.

Sympodium catenatum.—Molander, 1915:43.

Description.—See Herdman, 1883, 1895.

Material examined.—Isle of Man, 1 mile north of the Calf of Man, 30 m, coll. N. S. Jones; USNM 59480.

Remarks.—The sclerites of *S. catenatum* from British waters (Fig. 3) have somewhat more prominent and sharper sculpturing than do those of

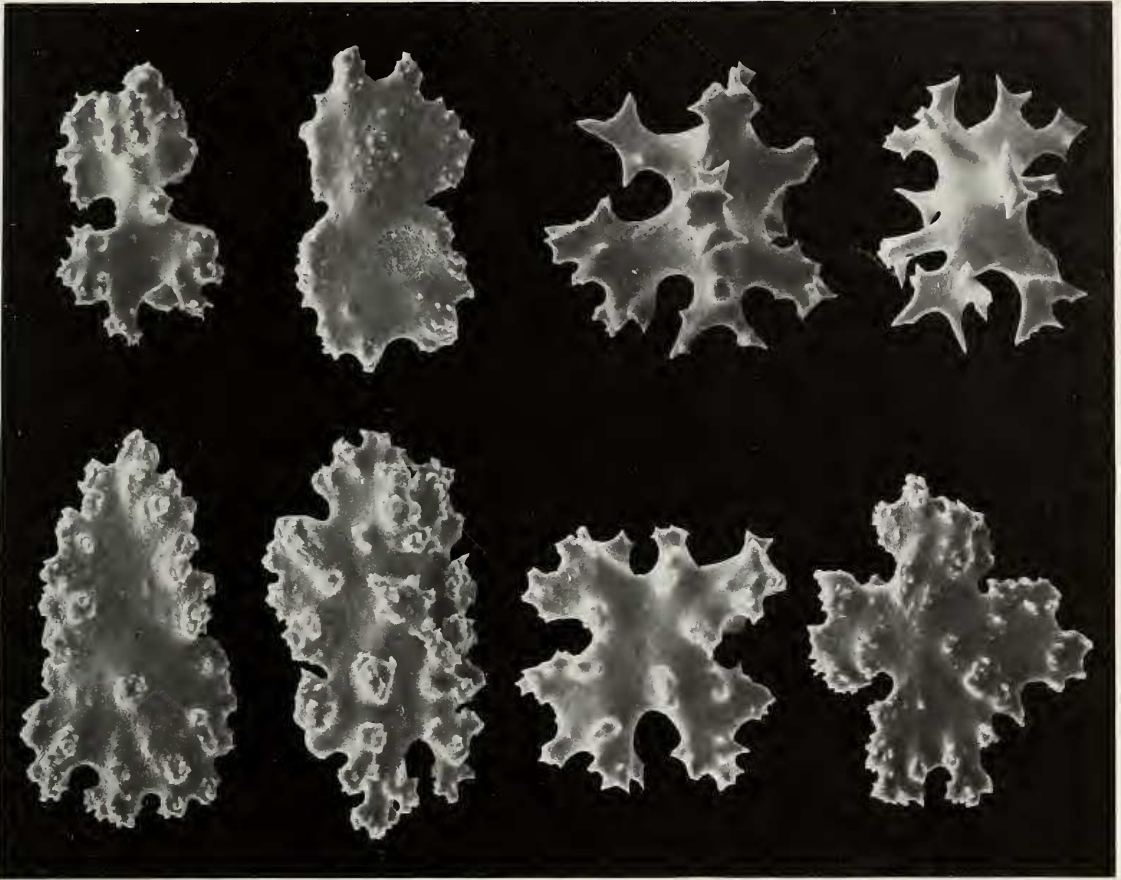


Fig. 3. *Sarcodictyon catenatum*. Sclerites, $\times 325$.

S. roseum from the Mediterranean illustrated by Weinberg (1978:pls. 17, 18), but the proportion of cross-shaped sclerites is similarly high.

Gohar (1940:13), also misled by the inaccurate definition of the genus *Sarcodictyon*, described a new species of stoloniferan as *Sarcodictyon gardineri* with 2 varieties, *rosea* and *alba*, from *Discovery* expeditions in the Southern Ocean. Specimens agreeing closely with Gohar's descriptions have been taken at several localities in the Southern Ocean by the U.S.S. *Eltanin*. They show that "*Sarcodictyon*" *gardineri* is a tall, slender, *Clavularia*-like form with sclerites inseparably fused in the body wall, anthocodial sclerites arranged in chevrons and, in some cases, with spiculiferous intrusion tissue filling the extreme proximal part of the anthosteles. They bear a closer resemblance to *Telesto* (now *Bathystepto*) *rigida* and *Cyathopodium* (now *Scyphopodium*) *ingolfi* than to *Sarcodictyon catenatum*. As these specimens have intrusion tissue with sclerites separable as in *Telestula* rather than fused into a rigid meshwork as in *Scyphopodium*, and have nothing at all to do with *Sarcodictyon*, it becomes necessary to establish a generic taxon to accommodate them.

Rhodelinda, new genus

Sarcodictyon.—Gohar, 1940:12 [part].

Diagnosis.—Anthosteles tall, simple, slightly clavate, with thin, brittle walls formed by inseparably fused sclerites, arising from ribbonlike stolons encrusting solid objects; fused, tuberculate spindles forming body walls arranged *en chevron* in 8 longitudinal tracts; basal part of gastric cavity with more or less extensive intrusion of mesogloea containing partially fused, irregularly branching sclerites not forming a firm calcareous lattice; anthocodiae fully retractile, armed with slender, thorny spindles converging in 8 points, the proximal ones becoming more or less transverse; color red, pink or white.

Type-species.—*Sarcodictyon gardineri* var. *rosea* Gohar, 1940.

Etymology.—From Greek *ῥόδον*, rose + meaningless suffix; gender, feminine.

Distribution.—Southern Ocean.

Rhodelinda gardineri (Gohar)

Fig. 4

Sarcodictyon gardineri var. *rosea* Gohar, 1940:13 (Tristan da Cunha, Gough Island, and other localities from 40–180 m; *Discovery* Exped.).

Description.—See Gohar, 1940:13.

Material.—Off Macquarie Island, 54°24'S, 159°01'E, to 54°25'S, 159°00'E, 79–93 m, *Eltanin* sta. 1417, 10 February 1965: 42 specimens, 36 attached to shells of *Chlamys delicatula* Hutton (all but 2 living when collected), 4 to shells of brachiopods, and 2 to stems of hydroids; of these, 10 on *Chlamys*, 4 on brachiopods, and 2 on hydroids were specially selected to show variation and assigned USNM no. 60218; remainder are under USNM no. 60219.

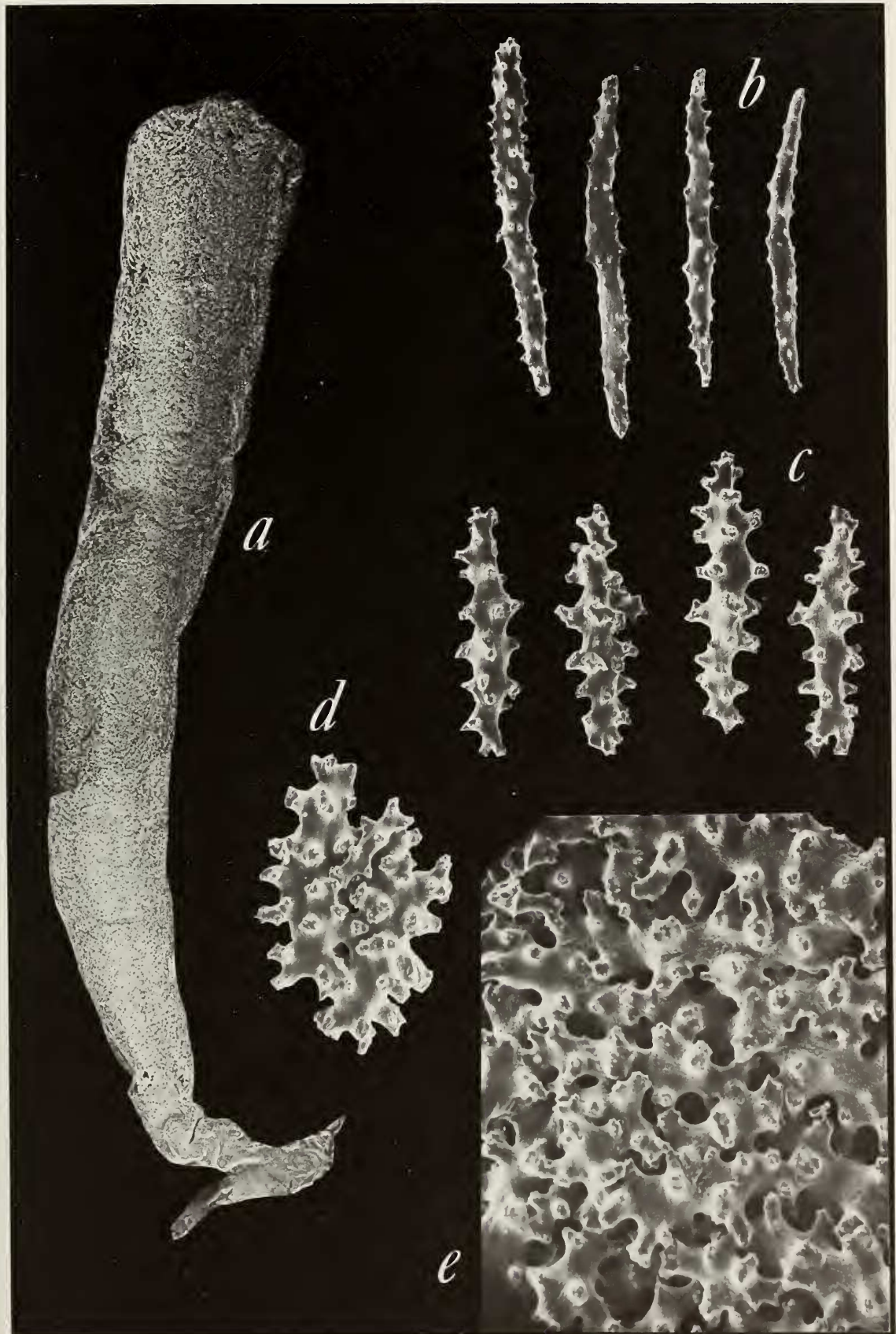
Off Macquarie Island, 54°32'S, 159°02'E, to 54°32'S, 159°01'E, 86–101 m, *Eltanin* sta. 1418, 10 February 1965: 8 specimens, 3 attached to shells of *Chlamys delicatula* alive when collected, 3 to hydroid stems, and 2 to brachiopod shells; USNM no. 60217.

The larger collection obtained at sta. 1417 probably does not indicate a denser population than at sta. 1418, but merely the longer duration of tow (53 minutes compared with 12 minutes at the latter).

Remarks.—Material in the present collection agrees with all aspects of

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Fig. 4. *Rhodelinda gardineri*: a, Polyp, contracted, ×8; b, Anthocodial sclerites, ×130; c, Unfused anthostelar sclerites, ×130; d, Partly fused anthostelar sclerites, ×130; e, Fully fused anthostelar sclerites, ×195.



Gohar's description, to which a few details can be added. The crowded polyps arise from ribbonlike stolons attached to hydroid stems and shells of lamellibranchs (*Chlamys delicatula*) and brachiopods. The stolons are 0.8 to 1.3 mm wide on a flat surface such as the brachiopod shells, but narrower if on hydroid stems or growing along the ribs of pectinid shells. The fully developed polyps are mostly 6–8 mm tall but in some colonies up to 16 mm exclusive of the anthocodiae, most of which are fully retracted; in other colonies, presumably younger, the tallest polyps do not exceed 4 or 5 mm. Distally the anthocodial diameter is as much as 2.2 mm but 1.5–1.8 mm is usual, and the proximal diameter is about 1 mm. The sclerites of the body wall are inseparably fused to form a rigid but brittle tube; distally they can be seen to lie *en chevron* in 8 longitudinal interseptal tracts, the distalmost sclerites unfused and extending as tapering points onto the thin anthocodial wall. Above the wide naked neck-zone, the anthocodial armature consists of numerous slender, prickly spindles arranged *en chevron* as 8 strong interseptal points below the tentacles; smaller, curved, prickly spindles and rods transversely surround the rachis of the tentacles but do not extend into the pinnules. The proximal sclerites of the interseptal points become transversely arranged and extend proximad a short distance as 8 distinct bands in the septal positions. Narrow secondary points occur septally between the interseptal major points. The color of all the colonies observed is bright, light red.

Comparisons.—These colonies are similar to species of *Clavularia* in general aspect but differ in the solidly fused sclerites. They resemble even more closely *Telesto rigida* Wright & Studer (now *Bathytelesto*), which has smaller polyps and completely unarmed tentacles. However, the latter was taken near the Azores at a depth of 1675 fathoms (3065 m), compared with depths of 79–101 m for the present specimens. Although study of additional material may show the two to be congeneric, the differently arranged anthocodial armature and the widely separated localities and depths warrant treating them as distinct genera for the present.

Scleranthelia Studer

Scleranthelia Studer, 1878a:137, 138 (no species included); 1878b:676; 1887:11.—Molander, 1929:29.—Aurivillius, 1931:33 (list of references).

Skleranthelia Studer, 1878b:634 (incorrect subsequent spelling without nomenclatural status; type-species, *Scleranthelia musiva* Studer, 1878, by subsequent monotypy), 676 (correctly spelled in list).—Bayer, 1956:F200.

Diagnosis.—See Aurivillius, 1931:34.

Remarks.—I overlooked the fact that the correct original spelling of this generic name was established by Studer (1878a:137) without included species in a preliminary paper rather than in his report of the same year

upon the Alcyonaria of the *Gazelle* expedition (Studer, 1878b:634). In the latter paper he misspelled it at the generic heading but not in the explanation of the figure (p. 634), nor on the plate (1, fig. 4), nor in the list of species collected at the various stations (p. 676). Thus, my usage of the spelling "*Sklerantheria*" (Bayer, 1956:F200) was unjustified.

Some authors (Molander, 1929:29; Aurivillius, 1931:34) have considered *Scleranthelia* to be a membranous gorgonacean related to *Parisia*, an interpretation based upon superficial resemblances. Both do, indeed, have large, polygonal, platelike sclerites and calices of similar form. However, the plates of *Parisia* (Fig. 6d) are shaped and sculptured differently from those of *Scleranthelia*, which have deeply lobed margins especially conspicuous in those of the stolons (Fig. 5b). The anthocodiae of both are but weakly spiculated, in *Parisia* with minute double heads having a long, smooth waist, in *Scleranthelia* with irregular thorny stars and short rods, many of them twinned as shown by distinct cruciform suture lines. Such differences, together with the fact that species of *Parisia* are chiefly reef inhabitants of the Indo-Pacific, whereas *Scleranthelia* lives on the continental slope in the Atlantic where no species of Parisididae occurs, argue persuasively against Molander's conclusion.

A small stoloniferous coral described by Pourtalès (1868:113) as *Sarcodictyon rugosum*, which was lost sight of until cruises of the University of Miami Deep-Sea Biology Program obtained specimens of it, evidently belongs to the genus *Scleranthelia* and differs from *S. musiva* only in its reticulate growth form.

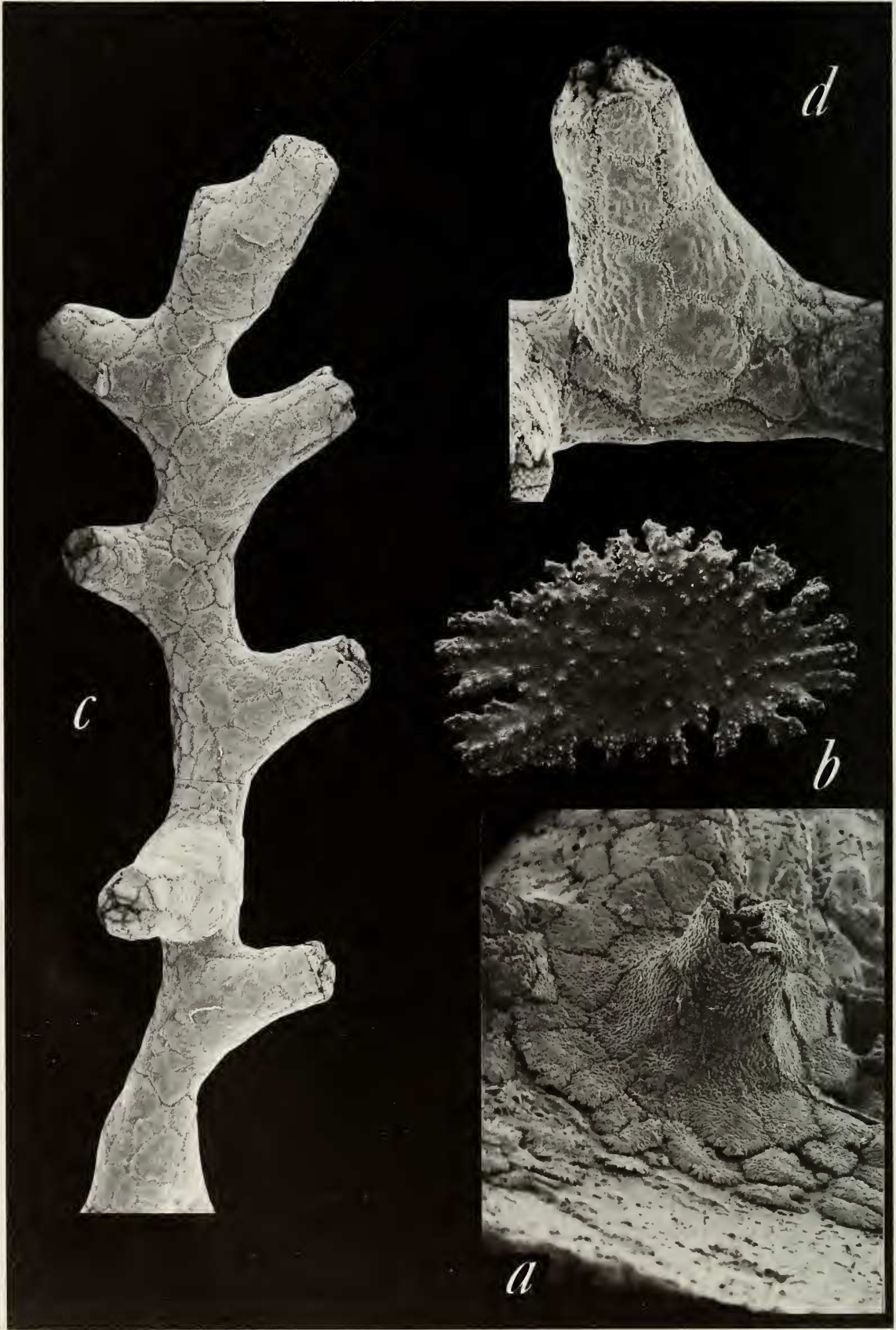
Scleranthelia rugosa (Portalès) growth form *rugosa*
Figs. 5a, b

Sarcodictyon rugosum Portalès, 1867:113 (off Havana, 270 fathoms).—Hickson, 1930:211.—Deichmann, 1936:37.

Scleranthelia musiva.—Carpine, 1964:3, figs. 1–3 (west coast of Corsica, 200–300 m; reticulate form).

Scleranthelia musiva var. *eugeniae* Aurivillius, 1931:34, fig. 6 (Azores, Pta. Delgada, 50–100 fm., *Josephine* Exped. d.86 K; both reticulate and membranous forms).

Description.—Colonies consist of conical calices 1–1.5 mm in diameter and up to about 5 mm tall arising from bandlike reticulating stolons about 0.75 mm wide; where the calices arise they may widen to 2.0–2.5 mm. On a hard substrate the stolons are very flat and the marginal plates thinly spread out, but on a porous substrate they are somewhat arched and the marginal plates are thick and have distinct edges. The spacing of calices varies from very close, with bases contiguous, to 5–10 mm apart. The calices vary in shape from low, bluntly conical to high conical or almost cylindrical,



with truncated top. Secondary polyps never arise from the wall of primary polyps. The entire surface is covered by a layer of thick, polygonal, platelike sclerites closely fitting as in mosaic but not solidly fused. On the stolons the largest plates are roughly 0.75 mm in diameter, but those of the calicular walls may be larger, reaching a length of 1 mm. There is no consistency in the shape of these plates, and fracturing evidently has occurred in many places, especially near the edges of the stolons where the plates are extremely thin and may be firmly cemented to the substrate. The outer surface of the plates is covered with low, rounded undulations beset with minute prickles. Adjoining edges, like the inner surface, are covered with complex tubercles.

The anthocodiae are fully retractile and weakly spiculated. The only sclerites are thorny stars and short rods with a few simple projections, whose exact location in the anthocodia could not be determined. The sclerites of the calicular margin decrease in size distad on the base of the anthocodial wall, thus affording the flexibility necessary for retraction. In full retraction, the oral end of the calices is protected by several (not usually, if ever, 8) irregularly shaped marginal plates. The form and size of the tentacles cannot be determined owing to strong contraction and poor preservation.

Beneath the superficial layer of large plates is a layer, best developed under the calices, of very irregular, branching sclerites showing some fusion. In effect, these occupy the base of the gastric cavities and may be similar to the intrusion tissue of *Telestula* and the calcareous lattice of *Scyphopodium ingolfi*, but anatomical studies will be necessary to clarify this point. The entire surface is covered by a thin, horny cuticle. Color greyish white, anthocodiae bright purple in life, fading to brown in preservation; spicules colorless or translucent white.

Material.—North of Little Bahama Bank: 27°29.5'N, 78°37.5'W, 485–496 m, R/V *Gerda* sta. G-252, 5 February 1964; 1 colony on shell of *Murex pazi* occupied by hermit crab; USNM 55446.

Straits of Florida NW of Matanilla Shoal, Little Bahama Bank: 27°45'N, 79°18'W, 531 m, R/V *Gerda* sta. G-665, 17 July 1965; 3 colonies on clinker and fragments of rock; USNM 55448.

Straights of Florida, west of Matanilla Shoal: 27°20'N, 79°22'W, 494–512 m, R/V *Gerda* sta. G-261, 7 February 1964; colony on small rock; USNM 55447.

Northwest Providence Channel, Bahamas: 26°27'N, 78°40'W, 514–586 m;

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Fig. 5. *Scleranthelia rugosa*: a, Growth form *rugosa*, calyx, $\times 18$; b, Growth form *rugosa*, sclerite from stolon, $\times 130$; c, Growth form *musiva*, part of colony on gorgonian axis, $\times 13$; d, Calyx of same, $\times 23$.

R/V *Gerda* sta. G-707, 22 July 1965; colony on dead shell of gastropod *Tugurium*; USNM 55449.

Northwest Providence Channel, Bahamas: 25°57'N, 78°13'W, 540–576 m, R/V *Gerda* sta. G-678, 20 July 1965; colony on glass bottle; USNM 56630.

Straits of Florida off Great Isaac: 26°07'N, 79°11'W, 311–329 m, R/V *Gerda* sta. G-509, 2 March 1965; large colony extensively covering clinker; USNM 55025.

Dominican Republic, off Isla Saona: 18°04.2'N, 68°44.3'W, 395 m, R/V *Pillsbury* sta. P-1369, 10 July 1971; colonies extensively covering 2 dead shells of gastropod *Tugurium*; USNM 55024.

Off Martinique: 14°26.5'N, 60°59.2'W, 274–388 m, R/V *Pillsbury* sta. P-906, 9 July 1969; colony on small rock; USNM 55453.

Remarks.—There is little doubt that this octocoral is the *Sarcodictyon rugosum* described by Pourtalès (1867:113) so briefly that later authors have even questioned its alcyonarian nature. Hickson's quotation of Pourtalès' description would, indeed, lead one to agree that *S. rugosum* is not an octocoral, for it implies hexamerous rather than octamerous symmetry. However, in examining specimens that are, beyond doubt, the same species that Pourtalès described, one can readily understand why he wrote that the calices are closed "by means of *about* [*italics mine*] six irregular rough pieces meeting together." The sclerites are not arranged in relation to the anatomical symmetry of the polyps, so the marginal ones closing the aperture need not be 8. In those polyps in which the marginal plates are large, 5 to 7 are usual numbers, but often the plates are smaller, more numerous, and irregularly placed. Hickson's use of the word 'covered' instead of 'closed' also gives a connotation different from Pourtalès original. Pourtalès' description of "six or eight membranous septa" merely reflects the difficulty of observing this feature in specimens of such small size.

Portalès' assignment of this coral to the genus *Sarcodictyon* was remarkably perceptive and would be reasonable even now were it not for spicular characters of generic significance. Morphologically, *Sarcodictyon*, *Scleranthelia*, *Tesseranthelia* (new genus) and *Cyathopodium* form a series in which the sclerites progress from small, separate 6-radiates showing a tendency toward platelike development, through large, irregular plates derived from crudely 6-radiate forms, large, angular plates developed around the calicular apertures as an operculum, to sclerites rigidly fused except in the anthocodiae. However, as the fused sclerites of *Cyathopodium* are not large plates but small tuberculate rods, that genus is probably more closely related to *Sarcodictyon* than to *Tesseranthelia* (new genus).

When *S. rugosa* occupies a small or narrow substrate, such as the axis of dead gorgonians, tubes of polychaete worms, or slender sponges, the stolons tend to spread out in membranous form, surrounding the object (Fig. 5a). Several of the lots examined consist of this growth form, in close agree-

ment with the original description of *S. musiva* (Studer, 1878b:634, pl. 1, fig. 4). In one lot (USNM 54858), the colonies cover a slender branching sponge that also supports some polychaete worm tubes and other epizoa; the stolons of *Scleranthelia* nearly or completely surround the narrow branches, but on a wider one they extend out in the reticular form of typical *S. rugosa*. This leaves no doubt that the membranous and reticular forms are related to the nature of the substrate and represent a single species. It is convenient to retain the junior name *musiva* to designate the membranous growth form. The material in the National Museum of Natural History has been subdivided accordingly.

Scleranthelia rugosa (Pourtalès), growth form *musiva* Studer
Figs. 5b, c, d

Scleranthelia musiva Studer, 1878b:634, pl. 1, fig. 4 (Cape Verde Is.: 15°52'N, 23°08'W, 115 fath., *Gazelle* Exped.).

Scleranthelia musiva var. *eugeniae* Aurivillius, 1931:34, fig. 6 (Azores, Pta. Delgada, 50–100 fath., *Josephine* Exped. d.86 K; both membranous and reticulate forms).

Description.—As for the reticular form except that stolons are sheetlike expansions. See Aurivillius, 1931:34.

Material.—Off Long Island, N.Y., about 75 miles south of Montauk Point: 37°37'50"N, 74°15'30"W, 262 m, *Albatross* sta. 2020, 21 May 1883; large colony on dead antipatharian axis; USNM 7437.

Off Great Inagua, Bahamas: 20°54.5'N, 73°28.2'W, 110–220 m, R/V *Pillsbury* sta. P-1143, 13 January 1970; colony on dead gorgonian axis, USNM 54857.—20°50'N, 73°34'W, 274–289 m, R/V *Pillsbury* sta. P-1140, 13 January 1970; large colony on dead gorgonian axis, USNM 54856.

Off San Pedro, Dominican Republic: 18°21'N, 69°14.3'W, 170–176 m, R/V *Pillsbury* sta. P-1303, 21 July 1970; several colonies on branching sponge, USNM 54858; one colony on dead gorgonian axis, USNM 55107.

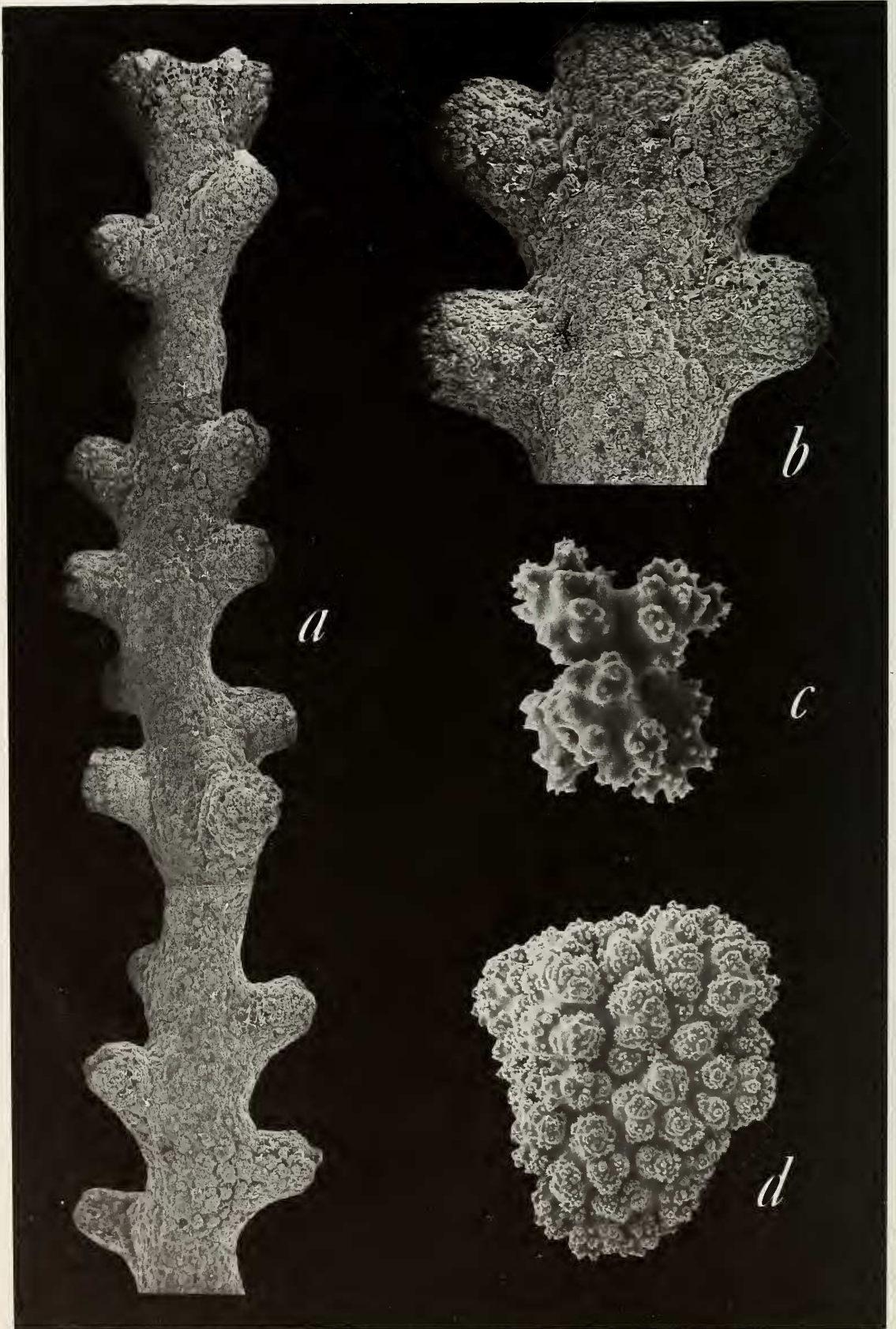
Off Santo Domingo, Dominican Republic: 18°21.4'N, 69°08.7'W, 165 m, R/V *Pillsbury* sta. P-1387, 9 July 1971; colony on dead gorgonian axis, USNM 55023.

Nicaragua, off Little Corn Island: 12°28'N, 82°28'W, 201 m, M/V *Oregon* sta. 3608, 2 June 1962; colony on fragment of gorgonian axis, USNM 55455.

Jamaica, off Pedro Bank: 17°17'N, 78°29'W, 146–183 m, M/V *Oregon* sta. 3554, 17 May 1962; colony on antipatharian axis, USNM 55454.

Venezuela, off Peninsula de Paria: 10°45'N, 62°00'W, 77–86 m, R/V *Pillsbury* sta. P-705, 18 July 1968; colony on branching polychaete worm tube, USNM 55452.

Off Guyana: 8°25'N, 58°08'W, 88–82 m, R/V *Pillsbury* sta. P-691, 15 July 1968; large colony on dead gorgonian axis, USNM 55451.



Remarks.—Colonies extensively covering denuded gorgonian axes (e.g., USNM 55107) closely resemble a gorgonacean with platelike sclerites.

Tesseranthelia, new genus

Diagnosis.—Narrow, ribbonlike stolons produce low, conical anthosteles at wide intervals; calicular walls formed by 6–8 large, closely fitted plates, apertures closed by well-differentiated triangular opercular scales; stolons covered by elongated, arched plates as wide as the stolons; anthocodiae with spinous rodlets. Color, red.

Type-species.—*Tesseranthelia rhodora*, new species.

Etymology.—From Ionic Greek τεσσερες, four, i.e., having four sides; hence, a square tessera as in mosaic + *Anthelia*, generic name of uncertain etymology in octocorals, possibly from Greek ἀνθήλη, dim. ἀνθήλιόν, flower, especially the plumose flower of a reed or, more likely, from Ἀνθήλεια, one of the Danaides. Gender, feminine.

Comparisons.—Growth form similar to *Scleranthelia* but having a well-differentiated operculum of triangular plates and a single row of long, arched sclerites covering the stolons.

Tesseranthelia rhodora, new species

Fig. 1a

Material.—Caribbean Sea off Dominican Republic: 18°21.4'N, 69°06.0'W, 149 m, R/V Pillsbury sta. P-1386, 9 July 1971; holotype colony attached to rock, USNM 56585.

Description.—Narrow, reticulating stolons 0.5–1.0 mm wide give rise at wide intervals to low, bluntly conical calices that may be situated at points of bifurcation. The calices are 3.5–4.5 mm in diameter, irregularly rounded in outline and about 1.5 mm tall; the calicular walls are covered by a single circlet of 5–6 roughly quadrangular plates, and the apertures closed by a well-differentiated operculum consisting of bluntly triangular scales basically 8 in number but sometimes more, possibly owing to breakage and repair. The tentacles contain small, spinous rodlets not organized as a crown and points. The stolons are covered by long, narrow, arched plates, set in a single series and presenting a segmented appearance. The large plates are almost glassily transparent and the granulated sculpture of their inner surface clearly shows through the smooth outer surface. The sclerites are bright red.

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Fig. 6. *Parisia fruticosa*: a, Part of branch of syntype, USNM 770, $\times 13$; b, Same $\times 23$; c, 6-radiate sclerite, $\times 487$; d, Coenenchymal plate, $\times 162$.

Holotype colony.—USNM 56585.

Etymology.—From *Rhodora*, a kind of rhododendron, from *rhodora*, Neo-Latin botanical name. A noun in apposition.

Comparison.—Apart from its bright red color, *T. rhodora* superficially resembles *Scleranthelia rugosa*. Even disregarding color, it is distinguished from all other known species by its calices formed of a single circlet of squarish plates and closed by a clearly differentiated operculum and by the single series of arched plates covering the stolons.

Classification

The taxonomic classification of stolonate Octocorallia is unsatisfactory. For the time being, I would prefer to avoid the issue of the validity of the ordinal taxa Stolonifera and Telestacea, and assign the genera treated in the foregoing pages only to families, leaving readers to place the families according to whatever scheme of classification best agrees with their own convictions. Unfortunately, the question of the validity of the family Telestidae cannot be avoided, and that question inevitably involves the ordinal taxa.

The order Telestacea comprises those stolonate forms that vegetatively produce secondary polyps from the anhostelar walls of the primary individuals. It therefore includes the genera *Telesto* Lamouroux, in which secondary polyps are produced abundantly, and *Telestula* Madsen in which they are produced sparingly. As some species that originally were placed in *Clavularia* (e.g., *C. tubaria* Wright & Studer, *C. spiculicola* Nutting, and *C. expansa* Thomson & Dean) differ from *Telestula* in no way other than that their polyps usually remain simple and must therefore be placed in that genus, it follows that secondary budding from the primary polyps is not a diagnostic character even at the generic level, much less at familial or ordinal levels. Thus there remains no distinction either between Telestidae and Clavulariidae, or between Telestacea and Stolonifera. Nevertheless, it is convenient to group those genera that predominantly (but not invariably) produce secondary polyps in a separate subfamily even though it merges with those genera that never bud secondarily. Adopting this approach then, the stoloniferan genera can be arranged as follows:

Stolonifera: polyps arising from reticulating or membranous stolons; anhosteles may be connected laterally by transverse stolon bars or platforms.

- A. No calcareous skeleton developed; polyps and stolons invested by thin organic perisarc: Cornulariidae (*Cornularia*)
- B. Calcareous skeleton in form of calcitic sclerites developed in addition to organic perisarc.
 1. Polyps retractile, divided into distinct anthocodial and anhostelar

parts by neck-zone with few or no sclerites, tentacles retractile within proximal anthostelar part.

- a. Polyps not connected laterally by transverse platforms, but, if tall, sometimes by a few transverse stolonial bars: Clavulariidae.
 - i. Polyps short, retracting almost flush into stolons, or producing low, conical or cylindrical calices: Sarcodictyiinae, new subfamily (*Cyathopodium*, *Sarcodictyon*, *Scleranthelia*, *Tesseranthelia*, *Trachythela*)
 - ii. Polyps tall, cylindrical or trumpet-shaped, rarely or never budding secondary polyps laterally: Clavulariinae (*Bathytelesto*, *Clavularia*, *Rhodelinda*, *Scyphopodium*)
 - iii. Polyps tall, cylindrical, commonly budding secondary polyps laterally.
 - *. Monopodial: Telestinae (*Carijoa*, *Paratelesto*, *Telesto*, *Telestula*)
 - †. Sympodial: Pseudocladochoninae (*Pseudocladochonus*)
 - b. Polyps connected laterally by regular or irregular transverse platforms: Tubiporidae (*Pachyclavularia*, *Tubipora*)
2. Polyps contractile but not retractile, not divided into anthocodial and anthostelar parts; colonies richly arborescent, axial polyps arising from spreading, stolonial holdfast: Coelogorgiidae (*Coelogorgia*)

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